

inserted into the remaining gap of the recessed portion 123 so as to eliminate the gap and provide a smooth, continuous surface across the tops of the side member 116, second insert member 174, and protruding support portions 121. In this regard, it will be appreciated that insert 170 has a size and shape like that of the protruding support portions 121, and complementary to the size and shape of the recessed portion 123.

[0029] While one auxiliary battery module 102 is illustrated in FIGS. 1A and 1B, multiple auxiliary battery modules 102 may be utilized and attached to (mounted in) the electric vehicle 100 and electrically connected together in parallel to provide further electrical power reserves, e.g., by placing one next to another. In such cases, one or more of the auxiliary battery modules may each be equipped with multiple electrical connectors in a manner such as described above to provide electrical connection between adjacent auxiliary battery modules 102 themselves as well as to the electric vehicle 100. Additional electrical connection considerations for such examples will be discussed below. Also, in such cases, one or more of the auxiliary battery modules may each be equipped with multiple fluid connectors in a manner such as described above to provide coolant flow between adjacent auxiliary battery modules 102 themselves as well as to the electric vehicle 100.

[0030] Another example of an electric vehicle system according to the disclosure is illustrated in FIGS. 4A-4C. The electric vehicle system illustrated in FIGS. 4A-4C comprises an electric vehicle 100 and another example of an auxiliary battery module 202. The electric vehicle 100 illustrated in the example of FIGS. 4A-4C is the same as the electric vehicle 100 previously described in connection with FIGS. 1A-1C and 3A-3C, and description of the electric vehicle 100 is not reproduced again here. In this example, the auxiliary battery module 202 has a different shape than the auxiliary module 102 previously described herein, the auxiliary battery module 202 having a shorter height, e.g., of about 8-12 inches, for instance, and a width and depth that about the same as the usable width and depth of the cargo area 112, e.g., about 48-60 inches by about 60-80 inches, for instance. These dimensions are merely exemplary, and other dimensions may be used.

[0031] In other respects, the construction and features of the auxiliary battery module 202 are like those of the auxiliary battery module 102 previously described. Briefly, the auxiliary battery module 202 includes a battery housing 203 and a battery disposed within the battery housing 203, the battery comprising a plurality of individual battery cells (not shown). The auxiliary battery module further includes a first conduit portion 240 within the auxiliary battery 202 for circulating coolant within the auxiliary battery module 202. The first conduit portion 240 may wind between and among the multiple individual battery cells (not shown) of the auxiliary battery module 202, and in this regard, the first conduit portion 240 may be configured as tubing (e.g., tubing of copper alloy, aluminum alloy, steel alloy, etc.) winding among the battery cells, e.g., with windings at multiple heights. Thermal contact between the first conduit portion 240 and the battery cells may be enhanced, e.g., by disposing any suitable thermal contact material disposed therebetween, such as thermoplastic materials with good thermal conductivity known in the art for conducting heat from and/or to battery cells. As shown in FIGS. 4A-4C, the auxiliary battery module 202 includes a first fluid connector

224 including an inlet port 224a and an outlet port 224b, and the electric vehicle 100 includes a complementary second fluid connector 126 that mates with the first fluid connector 224. The second fluid connector 126 includes an inlet port 126a and an outlet port 126b complementary to those of fluid connector 224, and provide liquid-tight couplings that permits flow of coolant from the electric vehicle 100 into the auxiliary battery module 202 and that permits return flow of coolant from the auxiliary battery module 202 to the electric vehicle 100. For example, these respective inlet ports and outlet ports can be provided by metal flat-face, dry-break connectors, such as illustrated by connector 150 and connector 160 shown in the example of FIG. 2 as previously described.

[0032] Additionally, the exemplary auxiliary battery module 202 includes a first electrical connector 220, and the electric vehicle 100 includes a second electrical connector 122 that mates with the first electrical connector 220 such that the auxiliary battery module 202 can provide electrical power to the electric motor(s) that propel the electric vehicle 202. The electrical connector 220 includes high-voltage connections 220a and 220b that permit the auxiliary battery module 202 to be electrically connected in parallel with the vehicle's primary battery and may include one or more low-voltage connections 220c, respectively, to provide electrical connection via connection 122c to sensors and electrical circuitry for monitoring and control associated with operation of the auxiliary battery module 202 when attached to the electric vehicle 100.

[0033] The auxiliary battery module 202 illustrated in FIGS. 4A-4C can be configured to be positioned in the cargo area 112 of the electric vehicle 100 while supplying electric power to the motor(s) that propel the electric vehicle, and can be configured to be removable from and reattachable to the electric vehicle 100. In this regard, as shown in FIGS. 4A-4C, fasteners such as threaded bolts may be placed through holes 234 of the auxiliary battery module 202 and fastened into receptacles such as threaded holes 139 located in the support surface 114 of the cargo area 112. Other latching mechanisms other than threaded bolts may be used to secure the auxiliary battery module 102, such as, for example, over-center latches with locks, tab-in-slot latching mechanisms (e.g., similar to seat belt/safety belt locking mechanisms), and electromechanical automatic cinching latches such as commonly used on vehicle door lock, provided they are made of suitable strength/gauge materials to accommodate the weight of the auxiliary battery module 102, which may be several hundred pounds or more.

[0034] In examples, the auxiliary battery module 202 may be lowered onto the electric vehicle 100 via a winch with cables attached to threaded eye-bolts which may be screwed into holes 234 of the auxiliary battery module 102 in examples where those holes 134 are threaded. Alternatively, temporary lateral lift bars with openings to accommodate forks of a forklift may be attached to the auxiliary battery module 202 so that the auxiliary battery module 202 can be lifted with a forklift and lowered onto the electric vehicle 100.

[0035] Of course, the battery housing 203 and any inner supports of the exemplary auxiliary battery module 202 should be constructed of sufficiently strong materials as discussed above for the exemplary auxiliary battery module 102 to withstand normal expected use remain secured under potential collision events.